

CLAIMS:

1. A polynucleotide that encodes an 84P2A9-related protein, wherein the polynucleotide is selected from the group consisting of:
 - 5 (a) a polynucleotide having the sequence as shown in FIG. 2, wherein T can also be U;
 - (b) a polynucleotide having the sequence as shown in FIG. 2, from nucleotide residue number 165 through nucleotide residue number 1676, wherein T can also be U;
 - 10 (c) a polynucleotide encoding an 84P2A9-related protein whose sequence is encoded by the cDNAs contained in the plasmids designated p129.1-US-P1 deposited with American Type Culture Collection as Accession No. PTA-1151;
 - (d) a polynucleotide encoding an 84P2A9-related protein that is at least 90%
15 identical to the amino acid sequence shown in FIG. 2 over its entire length; and
 - (e) a polynucleotide that is fully complementary to a polynucleotide of any one of (a)-(d).
2. A polynucleotide of claim 1 that encodes the polypeptide sequence shown in
20 FIG. 2.
3. A fragment of a polynucleotide of claim 1 comprising:
 - (a) a polynucleotide having the sequence as shown in FIG. 2, from nucleotide residue number 720 through nucleotide residue number 1392;
 - (b) a polynucleotide that is a fragment of the polynucleotide of (a) that is at
25 least 10 nucleotide bases in length; or

- (c) a polynucleotide that selectively hybridizes under stringent conditions to the polynucleotide of (a) or (b).
4. A polynucleotide that encodes an 84P2A9-related protein, wherein the polypeptide includes an amino acid sequence selected from the group consisting of KKRK, NQTN, NCSV, TNK, SRR, SSK, SVR, GLFTND, GGACGI, GGTPTS, GTPTSM and GSLCTG.
5. A polynucleotide that encodes an 84P2A9-related protein, wherein the polypeptide comprises an HLA class I A1, A2, A3, A24, B7, B27, B58, B62 supermotif, or an HLA class II O'Sullivan DR supermotif or an Alexander pan DR binding epitope supermotif or an HLA DR3 motif.
6. A polynucleotide of any one of claims 1-4 that is labeled with a detectable marker.
7. A recombinant expression vector that contains a polynucleotide of any one of claims 1-4.
8. A host cell that contains an expression vector of claim 7.
9. A process for producing an 84P2A9-related protein comprising culturing a host cell of claim 8 under conditions sufficient for the production of the polypeptide.
10. The process of claim 9, further comprising recovering the 84P2A9-related protein so produced.
11. An 84P2A9-related protein produced by the process of claim 10.
12. An isolated 84P2A9-related protein.
13. The 84P2A9-related protein of claim 12, wherein 84P2A9-related protein has the amino acid sequence shown in SEQ ID NO: 2.

14. An isolated 84P2A9-related protein that has an amino acid sequence which is exactly that of an amino acid sequence encoded by a polynucleotide selected from the group consisting of:
- 5 (a) a polynucleotide having the sequence as shown in FIG. 2, wherein T can also be U;
- (b) a polynucleotide having the sequence as shown in FIG. 2, from nucleotide residue number 165 through nucleotide residue number 1676, wherein T can also be U;
- 10 (c) a polynucleotide encoding an 84P2A9-related protein whose sequence is encoded by the cDNAs contained in the plasmids designated p129.1-US-P1 deposited with American Type Culture Collection as Accession No. PTA-1151;
- (d) a polynucleotide encoding an 84P2A9-related protein having the amino acid sequence shown in FIG. 2; and
- 15 (e) a polynucleotide that is fully complementary to a polynucleotide of any one of (a)-(d).
15. An isolated 84P2A9-related protein of claim 14 selected from the group consisting of:
- 20 (a) a polynucleotide having the sequence as shown in FIG. 2, from nucleotide residue number 720 through nucleotide residue number 1392;
- (b) a polynucleotide that is a fragment of the polynucleotide of (a) that is at least 10 nucleotide bases in length; or
- (c) a polynucleotide that selectively hybridizes under stringent conditions to the polynucleotide of (a) or (b).

16. An antibody or fragment thereof that immunospecifically binds to an 84P2A9-related protein.
17. The antibody or fragment thereof of claim 16, which is monoclonal.
18. A recombinant protein comprising the antigen binding region of a monoclonal antibody of claim 17.
19. The antibody or fragment thereof of claim 17, which is labeled with a detectable marker.
20. The recombinant protein of claim 18, which is labeled with a detectable marker.
21. The antibody fragment of claim 16, which is an Fab, F(ab')₂, Fv or Sfv fragment.
22. The antibody of claim 16, which is a human antibody.
23. The recombinant protein of claim 20, which comprises murine antigen binding region residues and human constant region residues.
24. A non-human transgenic animal that produces a monoclonal antibody of claim 20.
25. A hybridoma that produces an antibody of claim 22.
26. A single chain monoclonal antibody that comprises the variable domains of the heavy and light chains of a monoclonal antibody of claim 17.
27. A vector comprising a polynucleotide encoding a single chain monoclonal antibody that immunospecifically binds to an 84P2A9-related protein.
28. An assay for detecting the presence of an 84P2A9-related protein or polynucleotide in a biological sample comprising contacting the sample with an antibody or polynucleotide, respectively, that specifically binds to the 84P2A9-related protein or polynucleotide, respectively, and detecting the binding of 84P2A9-related protein or polynucleotide, respectively, in the sample thereto.

29. An assay for detecting the presence of an 84P2A9-related protein or polynucleotide comprising obtaining a sample, evaluating said sample in the presence of an 84P2A-related protein or polynucleotide, whereby said evaluating means produces a result that indicates the presence or amount of 84P2A9-related protein or polynucleotide, respectively.
30. An assay of claim 29 for detecting the presence of an 84P2A9 polynucleotide in a biological sample, comprising:
- (a) contacting the sample with a polynucleotide probe that specifically hybridizes to a polynucleotide encoding an 84P2A9-related protein having an amino acid sequence shown in FIG. 2; and
 - (b) detecting the presence of a hybridization complex formed by the hybridization of the probe with 84P2A9 polynucleotide in the sample, wherein the presence of the hybridization complex indicates the presence of 84P2A9 polynucleotide within the sample.
31. An assay for detecting the presence of 84P2A9 mRNA in a biological sample comprising:
- (a) producing cDNA from the sample by reverse transcription using at least one primer;
 - (b) amplifying the cDNA so produced using 84P2A9 polynucleotides as sense and antisense primers to amplify 84P2A9 cDNAs therein;
 - (c) detecting the presence of the amplified 84P2A9 cDNA,
- wherein the 84P2A9 polynucleotides used as the sense and antisense probes are capable of amplifying the 84P2A9 cDNA contained within the plasmid as deposited with American Type Culture Collection as Accession No. PTA-1151.
32. A method of claim 31 for monitoring 84P2A9 gene products comprising:

determining the status of 84P2A9 gene products expressed by cells in a test tissue sample from an individual;

comparing the status so determined to the status of 84P2A9 gene products in a corresponding normal sample; and

5 identifying the presence of aberrant 84P2A9 gene products in the test sample relative to the normal sample.

33. The method of claim 32, wherein the 84P2A9 gene products are monitored by comparing the polynucleotide sequences of 84P2A9 gene products in the test tissue sample with the polynucleotide sequences of 84P2A9 gene products in a
10 corresponding normal sample.

34. The method of claim 32, wherein the 84P2A9 gene products are monitored by comparing the levels 84P2A9 gene products in the test tissue sample with the levels of 84P2A9 gene products in the corresponding normal sample.

35. A method of diagnosing the presence of cancer in an individual comprising:
15 (a) determining the level of 84P2A9 mRNA or protein expressed in a test sample obtained from the individual; and

(b) comparing the level so determined to the level of 84P2A9 mRNA or protein expressed in a comparable known normal tissue sample,
whereby the presence of elevated 84P2A9 mRNA or protein expression in the
20 test sample relative to the normal tissue sample provides an indication of the presence of cancer.

36. The method of claim 35, wherein the cancer is selected from the group consisting of leukemia and cancer of the prostate, testis, kidney, brain, bone, skin, ovary, breast, pancreas, colon, and lung, and the test and normal tissue samples are
25 selected from the group consisting of serum, blood or urine and tissues of the prostate, testis, kidney, brain, bone, skin, ovary, breast, pancreas, colon, and lung.

37. Use of an 84P2A9-related protein or an immunogenic portion thereof, a vector comprising a polynucleotide encoding a single chain monoclonal antibody that immunospecifically binds to an 84P2A9-related protein, an antisense polynucleotide complementary to a polynucleotide having 84P2A9 coding sequences, or a ribozyme capable of cleaving a polynucleotide having 84P2A9 coding sequences, for the preparation of a composition for treating a patient with a cancer that expresses 84P2A9.
38. The use of claim 37, wherein the cancer is selected from the group consisting of leukemia and cancer of the prostate, testis, kidney, brain, bone, skin, ovary, breast, pancreas, colon, lymphocytic and lung.
39. A pharmaceutical composition comprising an 84P2A9-related protein, an antibody or fragment thereof that specifically binds to an 84P2A9-related protein, a vector comprising a polynucleotide encoding a single chain monoclonal antibody that immunospecifically binds to an 84P2A9-related protein, a polynucleotide comprising an 84P2A9-related protein coding sequence, an antisense polynucleotide complementary to a polynucleotide having an 84P2A9 coding sequences or a ribozyme capable of cleaving a polynucleotide having 84P2A9 coding sequences and, optionally, a physiologically acceptable carrier.
40. A method of treating a patient with a cancer that expresses 84P2A9 which comprises administering to said patient a vector comprising a polynucleotide encoding a single chain monoclonal antibody that immunospecifically binds to an 84P2A9-related protein, such that the vector delivers the single chain monoclonal antibody coding sequence to the cancer cells and the encoded single chain antibody is expressed intracellularly therein.
41. A vaccine composition for the treatment of a cancer expressing 84P2A9 comprising an immunogenic portion of an 84P2A9-related protein and a physiologically acceptable carrier.

42. A method of inhibiting the development of a cancer expressing 84P2A9 in a patient, comprising administering to the patient an effective amount of the vaccine composition of claim 41.
- 5 43. A method of generating an immune response in a mammal comprising exposing the mammal's immune system to an immunogenic portion of an 84P2A9-related protein of claim 41, so that an immune response is generated to 84P2A9.
- 10 44. A method of delivering a cytotoxic agent to a cell expressing 84P2A9 comprising conjugating the cytotoxic agent to an antibody or fragment thereof of claim 16 that specifically binds to an 84P2A9 epitope and exposing the cell to the antibody-agent conjugate.
45. A method of inducing an immune response to an 84P2A9 protein, said method comprising:
- providing an 84P2A9-related protein epitope;
- 15 contacting the epitope with an immune system T cell or B cell, whereby the immune system T cell or B cell is induced.
46. The method of claim 45, wherein the immune system cell is a B cell, whereby the induced B cell generates antibodies that specifically bind to the 84P2A9-related protein.
- 20 47. The method of claim 45, wherein the immune system cell is a T cell that is a cytotoxic T cell (CTL), whereby the activated CTL kills an autologous cell that expresses the 84P2A9 protein.
48. The method of claim 45, wherein the immune system cell is a T cell that is a helper T cell (HTL), whereby the activated HTL secretes cytokines that facilitate the cytotoxic activity of a CTL or the antibody producing activity of a B cell.